

### In the Claims

1. A method of removing mercury from a coal fired power plant exhaust gas comprising
  - passing said exhaust gas through a bulk particle collection device to remove coarse particles,
  - introducing powdered activated carbon into the exhaust gas downstream of said bulk particle collection device,
  - introducing said powdered activated carbon containing exhaust gas into a fine particle filter to separate mercury containing powdered activated carbon from said exhaust gas,
  - separating said powdered activated carbon from said mercury at an elevated temperature and in an inert gas environment, and
  - introducing said separated powdered activated carbon into said exhaust gas upstream from said fine particle filter.
2. The method of claim 1 including subsequent to separating said powdered activated carbon from said mercury and inert gas separating said mercury from said inert gas.
3. The method of claim 2 including effecting said desorption at a temperature of about 300 to 500 °C for about 5 to 60 minutes.
4. The method of claim 3 including effecting said desorption in a continuous process.
5. The method of claim 4 including after separation of said mercury from said inert gas introducing said inert gas into said exhaust gas upstream of said fine particle filter.
6. The method of claim 1 including introducing at least a portion of said desorbed powdered activated carbon into the combustion chamber of said coal fired process plant.

7. The method of claim 1 including  
employing said process on mercury containing exhaust gas having  
about 1 to 1000 ppm of mercury.
8. The method of claim 1 including  
subsequent to said fine particle filter removal recirculating at least a  
portion of said mercury containing powdered activated carbon into said exhaust gas  
upstream of said fine particle filter.
9. The method of claim 1 including  
employing nitrogen as said inert gas.
10. The method of claim 1 including  
removing ash in said coarse particle filter.
11. The method of claim 2 including  
employing said process on mercury containing exhaust gas having  
mercury in an amount of about 1 to 1000 ppm to about 1-10 micrograms per cubic  
meter of said exhaust gas.
12. The method of claim 1 including  
employing in said bulk particle collection device a coarse filter.
13. The method of claim 1 including  
employing in said bulk particle collection device an electrostatic precipitator.
14. Apparatus for recovering mercury from coal fired power plant exhaust  
gas comprising  
a bulk particle collection device for removing coarse particles from  
said exhaust gas,  
a fine particle filter disposed downstream of said coarse particle filter,  
a carbon source for introducing powdered activated carbon into said  
exhaust gas between said coarse particle filter and said fine particle filter,

said fine particle filter being structured to separate mercury containing powdered activated carbon from said exhaust gas,

a desorber for separating said powdered activated carbon from said mercury in an inert gas environment, and

recirculating said powder activated carbon through said exhaust gas between said coarse particle filter and said fine particle filter.

15. The apparatus of claim 14 including  
a separation unit for separating mercury from inert gas received from said desorption unit.

16. The apparatus of claim 14 including  
said desorption unit being structured to effect desorption at a temperature of about 300 to 500 °C for about 5 to 60 minutes.

17. The apparatus of claim 14 including  
said desorber structured to effect said desorption as a continuous process.

18. The apparatus of claim 15 including  
said mercury and inert gas separation unit being structured to deliver separated inert gas to said exhaust gas.

19. The apparatus of claim 14 including  
said desorber being structured to effect separation of mercury from said powdered activated carbon in mercury amounts of about 1 to 1000 ppm.

20. The apparatus of claim 14 including  
said coarse particle filter being structured to remove ash from said exhaust gas.

21. The apparatus of claim 14 including  
a first conduit for delivering powdered activated carbon from said desorber to said exhaust gas intermediate said coarse particle filter and said fine particle filter.

22. The apparatus of claim 14 including  
a second conduit for delivering powdered activated carbon separated in said desorber to the combustion unit of said coal fired power plant.

23. The apparatus of claim 15 including  
said desorber being structured to effect separation of mercury from  
said powdered activated carbon in mercury amounts of about 1 to 1000 ppm to about  
1-10 micrograms per cubic foot of said exhaust gas.

24. The apparatus of claim 14 including  
said bulk particle collection device having a coarse filter.

25. The apparatus of claim 14 including  
said bulk particle collection device having an electrostatic precipitator.